Coordinated voltage control scheme for distribution grid with on-load tap-changer and distributed energy resources in a market context - DTU Orbit (18/01/2019)

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The evolutionary changes in the electricity system are reshaping the system operation and control to achieve a more sustainable environment. In this transition, distributed energy resources (DERs) may introduce some problems, such as intermittent features, but could also play an important role on accommodating the intermittence and assisting system operation. A proper aggregation and coordination scheme of DER units is required to enable the flexibility provision in an economical and efficient manner. In the meanwhile, nondistruptive control of the units is essential to guarantee their long-term active participation. In addition, a newly established system should also allow and coordinate other controllable grid facilities. This paper proposes a hierarchical operating framework for DER units and controllable grid assets in a market environment. Voltage regulation as a common distributed system service is used for case study. The necessity of the coordination between DER units and the grid facilities, e.g., on-load tap-changer (OLTC), is addressed.

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